

Application No. 09/749,291

AMENDMENTS TO THE CLAIMS

A detailed listing of all claims that are, or were, in the present application, irrespective of whether the claim(s) remains under examination in the application are presented below. The claims are presented in ascending order and each includes one status identifier.

1. (Original) A method of cutting stent stock to a predetermined length to make a stent, the stent stock formed of a plurality of elongate strands braided to create a pattern of diamonds wherein the diamond vertices are defined by intersecting strands and are aligned to form a plurality of rows of vertices wherein each row lies in a plane which is substantially normal to a central axis of the stent stock, the cutting method forming a sphere on the end of each strand of the resulting stent, the method comprising:

providing a mandrel sized to receive a length of braided stent stock thereon, the mandrel having a central axis and an anchoring mechanism, operably attached thereto, and releasably fixing said stent stock relative to said mandrel; providing a focused heat source capable of melting a predetermined length of one of the elongate strands;

providing a length of braided stent stock; placing said stock on said mandrel at a predetermined axial position along said mandrel;

engaging said anchoring mechanism, thereby fixing said axial position of said stock length to said mandrel;

aligning said heat source with said stent stock such that said heat source is aimed substantially between two adjacent rows of vertices;

rotating said mandrel around said central axis at said predetermined angular speed in a first direction;

heating and separating, with said heat source, only those strands presenting acclivitous angles to the path of relative movement between the heat source and the stent stock;

Application No. 09/749,291

rotating said mandrel around said central axis at said predetermined angular speed in a second direction opposite said first direction; and,

heating and separating all remaining strands using said heat source as said strands pass beneath said heat source.

2. (Original) The method of claim 1 wherein providing a heat source comprises providing a laser.

3. (Original) The method of claim 1 wherein providing a mandrel with an anchoring mechanism comprises providing a mandrel defining an inner channel and further defining a plurality of apertures each housing an inwardly biased, outwardly displaceable protuberance constructed and arranged to act as an anchoring mechanism for said stent stock when said protuberance is outwardly displaced.

4. (Original) The method of claim 3 wherein providing a mandrel with an anchoring mechanism further comprises:

providing an elongate activation dowel constructed and arranged to be insertable into said inner channel and having an angled surface for progressively acting on said protuberances as said dowel is inserted into said inner channel; and,

inserting said activation dowel into said mandrel while monitoring the relative positions of said stent stock and said protuberances as said protuberances emerge from said cavities.

5. (Original) The method of claim 4 wherein providing a mandrel with an anchoring mechanism further comprises slightly sliding said stent stock along said axis, if necessary, to free said stock of any interference with said protuberances.

Application No. 09/749,291

6. (Original) The method of claim 1 wherein cutting all remaining strands using said heat source as said strands pass beneath said heat source comprises allowing heat from said heat source to come within operable proximity to said stent stock while a strand passes beneath said heat source and preventing heat from said heat source from coming within operable proximity to said stent stock whenever no strand is present therebeneath.

7. (Original) The method of claim 3 wherein providing a mandrel with an anchoring mechanism further comprises providing a mandrel defining apertures which extend radially from said central axis.

8. (Original) The method of claim 3 wherein providing a mandrel with an anchoring mechanism further comprises providing a mandrel defining apertures each housing protuberances comprising pins having an outside diameter sized to snugly fit within said diamonds.

9. - 15. (Cancelled)

16. (Original) A method of cutting stent stock to a predetermined length, the stent stock formed of a plurality of elongate strands braided such that the strands intersect to create a diamond pattern wherein the intersections define vertices of the diamonds and are substantially aligned to form a plurality of rows of vertices, the vertices in each row being substantially coplanar lying in a plane which is substantially normal to a central axis of the stent stock, the method comprising:

Application No. 09/749,291

providing a focused heat source capable of creating an area of heat having an upper side and a lower side and providing sufficient heat to melt a predetermined length of one of the elongate strands;

providing a length of braided stent stock;

aligning said stent stock with said heat source such that said heat source is aimed substantially between two of the rows of vertices that are adjacent to each other

rotating said stent stock relative to said heat source such that said heat source remains aimed substantially between the two adjacent rows of vertices,

intermittently allowing and preventing said area of heat from said heat source to come within operable proximity to said stent stock such that only strands having substantially acclivitous angles relative to said heat source are subjected to said area of heat and are melted, thereby forming a sphere on said strand proximate the upper side of said area of heat, until all strands having acclivitous angles relative to said heat source are melted;

reversing said relative rotation between said heat source and said stent stock such that the remaining strands present acclivitous angles to said heat source as the strands enter said area of heat; and,

subjecting the remaining strands to said area of heat, thereby forming a sphere on each remaining strand proximate the upper side of said area of heat.

17. (Original) The method of claim 16 further comprising:

providing a mandrel sized to receive said length of braided stent stock thereon, said mandrel having an anchoring mechanism operably attached thereto releasably fixing said stent stock relative to said mandrel; placing said stock on said mandrel at a predetermined axial position; and,

Application No. 09/749,291

engaging said anchoring mechanism, thereby fixing said axial position of said stock length to said mandrel.

18. (Original) The method of claim 17 further comprising the steps of:

providing a mechanism for turning said mandrel around its central axis at a predetermined angular speed; and,

rotating said mandrel around said central axis at said predetermined angular speed using said turning mechanism.

19. (Original) The method of claim 16 further comprising making a plurality of cuts in a similar manner, moving said stent stock in a direction along said axis relative to said heat source between each cut, thereby forming a plurality of stents having two ends defined by the cut strands, each of said strands having a sphere on each end.

20. – 30. (Cancelled)

31. (Original) A method of cutting a length of braided stent stock using heat from a focused heat source, the stent stock having a plurality of strands helically braided such that half of the strands take the form of a right-handed helix and the other half take the form of a left-handed helix, the right-handed helices arranged equidistantly from each other to loosely define a cylinder having a central axis, the left-handed helices arranged equidistantly from each other and interwoven with said right-handed helices to better define said cylinder and to form a plurality of intersections between the strands of the right-handed helices and the left-handed helices, the intersections and the strands thereby forming a relatively uniform pattern of diamonds having vertices defined by the intersections and sides defined by the strands, the method comprising:

Application No. 09/749,291

aligning the heat source relative to the stent stock so the heat source is aimed at the stent stock between two longitudinally adjacent vertices;

rotating the stock around its central axis in operable proximity to the heat source in a first direction;

allowing heat from the heat source to come within operable proximity to the stent stock whenever a strand forming a left-handed helix passes by the heat source, thereby melting the strand and forming a sphere thereon;

preventing heat from the heat source from coming within operable proximity to the stent stock before a strand forming a right-handed helix passes by the heat source;

rotating the stock in a second direction, opposite the first direction, after all of the strands forming a left-handed helix have been melted by the heat source; and,

allowing heat from the heat source to come within operable proximity to the stent stock whenever a strand forming a right-handed helix passes by the heat source, thereby melting the strand and forming a sphere thereon.

32. (Original) The method of claim 31 wherein allowing heat from the heat source to come within operable proximity to the stent stock comprises turning the heat source on.

33. (Original) The method of claim 31 wherein allowing heat from the heat source to come within operable proximity to the stent stock comprises opening a shutter to allow said heat to pass therethrough.

34. (Original) The method of claim 31 wherein preventing heat from the heat source from coming within operable proximity to the stent stock comprises turning the heat source off.

Application No. 09/749,291

35. (Original) The method of claim 31 wherein preventing heat from the heat source from coming within operable proximity to the stent stock comprises closing a shutter to block said heat from passing therethrough.

36. (Original) The method of claim 31 further comprising preventing heat from the heat source from coming within operable proximity to the stent stock, while rotating the stock in said second direction, substantially whenever a strand forming a right-handed helix is not passing by the heat source.

37. - 46. (Cancelled)

47. (Original) A method of fabricating a stent comprising:

providing a stock of stent material of braided wires;

determining a length of a segment to separate from said stent material;

separating said segment from said stent material such that each of said wires has a gap defined between a wire upper end and a wire bottom end; and,

at a time no earlier than said act of separating, melting a predetermined length of said upper end of each of said wires so as to form a sphere on said upper end of each of said wires, said predetermined length being defined at least by an effective melting source path width and by an acclivitous angle at which said upper end and a melting source contact each other.

48. (Original) A method according to claim 47, wherein, at a time no earlier than said act of separating, melting a predetermined length of said bottom end of each of said wires so as to form a sphere on said bottom end of each of said wires, said predetermined length being defined at least by an effective melting source path width.

Application No. 09/749,291

49. (Original) A method according to claim 47, wherein said melting a predetermined length of said upper end of each of said wires is done simultaneously with said act of separating.

50. (Original) A method according to claim 47, wherein said melting a predetermined length of said upper end of each of said wires is done after said act of separating.

51. (Original) A method according to claim 48, wherein said melting a predetermined length of said upper ends and bottom ends of each of said wires is done simultaneously with said act of separating.

52. (Original) A method according to claim 47, wherein said melting a predetermined length of said upper end of each of said wires is performed such that each end is melted in a sequential manner.

53. (Original) A method according to claim 47, wherein said acclivitous angle is in the range of approximately 130 to 175 degrees.

54. (Original) A method according to claim 47, wherein melting a predetermined length of said upper end of each of said wires so as to form a sphere on said upper end of each of said wires comprises:

aligning said melting source relative to said stent material so said melting source is aimed at said stent material between two longitudinally adjacent rows of vertices formed by intersecting wires;



Application No. 09/749,291

rotating said stent material in operable proximity to said melting source in a first direction;

emitting energy from said melting source toward said stent before said melting source, and any of said wires presenting said acclivitous angle, pass each other;

preventing said melting source from emitting energy toward said stent before said melting source, and any of said wires presenting a declivitous angle, come into operable proximity;

rotating said stent material in operable proximity to said melting source in a second direction, opposite said first direction, after all of said wires presenting said acclivitous angles have passed said melting source, such that said wires presenting declivitous angles now present acclivitous angles relative to the heat source; and,

turning said melting source on before said melting source, and any of said wires presenting said acclivitous angle, pass each other.